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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/623,679

07/22/2003

Koji Nozaki

030891

5083

38834

7590

12/12/2008

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EXAMINER

WALKE, AMANDA C

ART UNIT

PAPER NUMBER

1795

MAIL DATE

DELIVERY MODE

12/12/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/623,679	<b>Applicant(s)</b> NOZAKI ET AL.	
	<b>Examiner</b> Amanda C. Walke	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/26/08 has been entered.

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3 and 5-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishibashi et al (6,579,657) in view of Forsberg et al (4,661,275 or 4,749,500) or Markovich et al (5,055,342).

Ishibashi teaches a method for manufacturing a semiconductor device: A first resist pattern is formed from a first resist (a mixture of *novolac resin* and a naphthoquinonediazide photosensitive agent) on a semiconductor base layer. A second resist is formed on the first resist pattern which generates crosslinking reaction in the presence of an acid. A crosslinked film is formed at a portion of the second resist contacting with the first resist pattern by the agency of an acid fed from the first resist pattern. Non-crosslinked portions of the second resist are removed (i.e., developed) to form a second resist pattern. Finally, the semiconductor base layer is

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subjected to etching through the second resist pattern used as a mask. Ishibashi teaches (see col.2, lines 31-38, lines 62-65) as the second resist material, a fine pattern-forming material, which is a *mixture* of *water-soluble* resin such as polyvinyl alcohol or polyvinyl acetal and a crosslinking agent such as a melamine derivative or a urea derivative. Ishibashi teaches (col.9, lines 6-12) that in order to improve the film-forming properties, surface active agents such as non-ionic polyoxyethylene nonylphenyl ether type surfactant can be added to the second resist material. Ishibashi teaches (col.7, lines 34-50) that as his *water-soluble* resin for the second resist, polyacrylic acid, polyvinyl acetal, polyvinylpyrrolidone, polyvinyl alcohol, polyethyleneimine, polyethylene oxide, styrene-maleic acid copolymer, polyvinylamine resin, polyallylamine, oxazoline group-containing resists, water-soluble melamine resins, water-soluble urea resins, alkyd resins, and sulfone amide resins can be used and that the water-soluble resins may be used singly or *in combination of two or more*. Therefore, it would have been obvious to one of ordinary skill in the art to use the combination of polyvinyl acetal (or polyvinyl alcohol) and styrene-maleic acid copolymer as Ishibashi's water soluble resin for the second resist with a reasonable expectation of obtaining a material for finely isolated resist patterns capable of reducing an isolation size or hole size in the pattern when the resist pattern is formed in a semiconductor manufacturing process. Since the styrene-maleic acid copolymer is water soluble aromatic compound as well as a resin containing an aromatic compound in a portion thereof, Ishibashi meets the instant claim limitations. Ishibashi teaches that non-ionic surfactants may be employed, but fails to specifically teach the instantly claimed non-ionic surfactants.

Forsberg et al and Markovich et al each teach resin composition combinations that employ non-ionic surfactants such as Triton X-100, an octylphenol ethoxylate, a well known

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surfactant, therefore it would have been obvious to one of ordinary skill in the art to prepare the material of Ishibashi et al choosing to employ the surfactant of any of Forsberg et al or Markovich et al as the non-ionic surfactant with reasonable expectation of achieving a material for forming a fine pattern.

New claim 31 is a combination of claims 13, 29, and 30, which are all rejected, therefore the references of record also teach the limitations of the instant claim 31.

### ***Response to Arguments***

Applicant's arguments filed 11/26/08 have been fully considered but they are not persuasive. Applicant has again argued in the after final response entered with the filing of the RCE that the references of record may not be combined as the secondary references do not teach that improving the thickening feature of a resist pattern, and because the Ishibashi doesn't teach that its material would thicken a resist. Firstly, while Ishibashi teaches two similar materials to that instantly claimed and teaches that any known non-ionic surfactants may be employed in the materials and may not specifically teach that the one material thickens the other, the examiner does not agree that the disclosure of ArF is not enabling. The citation in column 6, seems to state that the material is capable of being exposed to ArF despite applicant's statement that it does not. Triton X-100 is a well known and widely used non-ionic surfactant, and when employed in the material of Ishibashi et al, the material would thicken the resist pattern, as the materials of Ishibashi as discussed above, are so similar to those employed and claimed in the instant invention. Absent evidence to the contrary, it is the position of the examiner that when the surfactant of either of the secondary references is employed as the surfactant in Ishibashi, the resultant material would thicken the resist pattern. Furthermore, according to the Supreme Court,

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the teaching, suggestion, or motivation test (TSM test) is one of a number of valid rationales that could be used to determine obviousness. It is not the only rationale that may be relied upon to support a conclusion of obviousness. (KSR International Co. v. Teleflex Inc., 82 USPQ2d 1385 (2007)).

All of the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

With respect to the secondary references, they are relied upon solely for the teachings of known surfactants and not for the entire material itself, therefore this argument is also unpersuasive. For the reasons given above, the examiner maintains her rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Amanda C. Walke whose telephone number is 571-272-1337.

The examiner can normally be reached on M-R 5:30-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Amanda C Walke  
Primary Examiner  
Art Unit 1795

/Amanda C Walke/  
Primary Examiner, Art Unit 1795